

# SURGICAL TREATMENTS FOR WOMEN WITH STRESS URINARY INCONTINENCE: A NETWORK META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS

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RESEARCH TYPE

Clinical

ABSTRACT CATEGORY

Female Stress Urinary Incontinence (SUI)

Abstract 234
Female Stress Urinary Incontinence Scientific Podium Short Oral Session 12
Wednesday 29th August 2018
16:00 - 16:07
Hall B
Incontinence Surgery Mathematical or statistical modelling Female
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## ABSTRACT

### HYPOTHESIS / AIMS OF STUDY

There have been many randomised controlled trials (RCTs) to compare surgical interventions for the treatment of women with stress urinary incontinence (SUI). Eight Cochrane systematic reviews of RCTs have evaluated nine surgical options available to treat SUI. The evidence from these reviews has been of limited usefulness due to a focus on discrete two-way comparisons, making it difficult for women and clinicians to judge which treatment is best overall. The aim of this study was to draw together all relevant evidence and conduct a network meta-analysis to compare the available surgical treatments with each other.

### STUDY DESIGN, MATERIALS AND METHODS

We systematically reviewed nine surgical interventions for women with SUI: open and laparoscopic colposuspensions, traditional suburethral slings, retropubic and transobturator mid-urethral slings (MUS), single incision slings, anterior vaginal repair, bladder neck needle suspension and periurethral bulking agents. A valid comparator was one of the included interventions. We identified relevant RCTs from the existing Cochrane systematic reviews and updated literature searches using the Cochrane Incontinence Group Specialised Trials Register, which contains trials identified from the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, MEDLINE In-Process, MEDLINE Epub Ahead of Print, ClinicalTrials.gov, WHO ICTRP and handsearching of journals and conference proceedings (searched May 2017). Primary outcomes were cure rate and improvement rate at 12 months, analysed by means of a network-meta analysis (NMA), with results presented as odds ratio (OR) and 95% credible intervals (CrI), and the surface under the cumulative ranking curves (SUCRA) to summarise treatment ranking. Adverse events were compared using pair-wise meta-analyses. Risk of bias was assessed using the Cochrane risk-of-bias tool. Quality of evidence for NMA was assessed using the GRADE approach.

### RESULTS

The review included 153 trials identified from 8 Cochrane reviews and 31 new trials. There were 21,598 women included in total. Studies were generally of small sample size (ranging from 15 to 655 participants, with a median of 91 participants per study) and short follow-up (ranging from 1 to 126 months, with a median of 12 months). Blinding of practitioners and/or patients to treatment allocation was not always possible due to the nature of intervention (surgery) and the risk of bias in most other domains was generally unclear.

There were 105 trials with usable data for cure and 120 trials for improvement for NMA. Results indicated that, on average, women who had traditional sling and retropubic MUS were more likely to experience cure of incontinence symptoms compared with those who had other surgical procedures (e.g., compared with retropubic MUS, OR for traditional sling 1.06, 95% CrI 0.62 to 1.85 [quality of evidence: very low]; OR for open colposuspension 0.85, 95% CrI 0.54 to 1.33 [quality of evidence: very low]; OR for transobturator MUS 0.74, 95% CrI 0.59 to 0.92 [quality of evidence: moderate]). Women were also more likely to experience an improvement in their incontinence symptoms after receiving retropubic MUS or transobturator MUS compared with other surgical procedures (e.g., compared with retropubic MUS, OR for transobturator MUS 0.76, 95% CrI 0.59 to 0.98 [quality of evidence: moderate]; OR for traditional sling 0.69, 95% CrI 0.39 to 1.26 [quality of evidence: low]; OR for open colposuspension 0.65, CrI 0.41 to 1.02 [quality of evidence: low]).

SUCRA showed that traditional sling and retropubic MUS had an average probability of 89.4% and 89.1%, respectively, of resulting in higher cure rates than other surgical procedures. Retropubic MUS and transobturator MUS had a probability of 97% and 76.1%, respectively, of resulting in the highest improvement rates.

Limited data were available for the assessment of complications. Numbers of events included in the analyses were generally small and, therefore, confidence intervals wide. This was mainly due to lack of available data but also inconsistent reporting across individual trials and across Cochrane systematic reviews in terms of the type and definition of complications as well as the time points at which these were measured. Crucially, long-term data on adverse events were lacking. In general, rate of tape and mesh exposure was higher after transobturator MUS than after retropubic MUS or single incision sling, while the rate of tape or mesh erosion or extrusion was similar between transobturator MUS and retropubic MUS. Retropubic MUS had a higher rate of major vascular complications, voiding difficulties, and bladder or urethral perforation than transobturator MUS but a lower rate of groin pain. Rate of post-operative pain was higher after retropubic than single incision sling.

### INTERPRETATION OF RESULTS

Traditional slings and retropubic MUS were the most likely treatments to cure symptoms of SUI, while retropubic and transobturator MUS were most likely to improve SUI symptoms, compared with other available

surgical procedures. However, some comparisons had a limited number of studies and there is considerable uncertainty around the estimates of effect. Quality of evidence was downgraded mainly for risk of bias and imprecision.

#### **CONCLUDING MESSAGE**

We found that retropubic MUS, transobturator MUS and traditional slings appear to be more effective in resolving or reducing SUI symptoms compared with the other included interventions. Crucially, there is a lack of data on the long-term outcomes, particularly long-term complications which were rarely adequately reported. Further research to reduce uncertainty around long-term outcomes of all relevant surgical treatments would be needed to better inform decision making.